Doctor of Philosophy
Panel Chair Report

(To be completed by the Panel Chair in conjunction with the Examiners following a PhD Oral Examination)

Name of Panel Chair:	Mohi Ahmed	Date of Exam:	30/09/2024
Name of Candidate:	Kulsoom Saima Bughio	Start Time (HH:MM):	10:00
Student ID:	10485075	End Time (HH:MM):	11:00
Thesis/Exegesis Title:	IoMT Security:A Semantic Framework for Vulnerability Detection in Remote Patient Monitoring		

Examiner Full Name	Institution	Attendance
Dr Bharanidharan Shanmugam	Charles Darwin University	Zoom
Prof Amiya Tripathy	Don Bosco Institute of Technology	Zoom

Supervisor Full Name	Institution	Attendance
David Cook	ECU	Zoom
Afaq Shah	ECU	Zoom
		Zoom
		Zoom

Attendee Full Name	Role	Attendance
Yvonne Garwood	Admin Support	Zoom
		Zoom

Report of Examination: Summary of Oral Component

The examiners comments regarding the presentation and their research are as follows:

(Examiner questions can be included in this section. Additional commentary can be attached as an Appendix.)

The examiners appreciated the thesis, research contributions, and presentation very much. The candidate answered all the questions raised to a satisfactory standard. The examiners praised the quality of the candidate's research publications and the timeliness of the thesis.

Report of Examination: Summary of Oral Component *(continued)*

Dr Bharanidharan asked the following questions:

Can you explain your background in medical technologies? – This is just to understand the background of the student.
When the research would have started few years ago, GenAI would not be there. What is your motivation to select GenAI rather than traditional ML/DL techniques.
There has been many terminologies and keywords used in the thesis, can you explain your thesis in a few words that could be understood by someone without any technical background.
With so many technologies used, will it not complicate the implementation process soon?
What are the future plans to integrate Zero Day vulnerabilities that could be found in other sources other than NVD and other databases?
What is the base for your case study? Did you look in the literature for any best scenarios for case studies?
The medical devices are heterogeneous, could you share your experience in collecting the information related to your studies.
Can you explain the steps you followed to maintain the privacy do the data collected ? In addition, have you applied the Australian Privacy principles?

Dr Amiya asked the following questions related to the following topics:

Countermeasures for cyber security in IoMT
IoMT Dynamism and its imapct on cyber vulnerabitlies
Ontology and SSACL impact on the validation
Justification for the usage of LLM and other considerations
Evaluation Metric and Accuracy

Required Amendments

The specific amendments to the thesis/exegesis agreed to by the Examiners are:

(Note: Prior to the oral examination, copy the suggested changes from both Examiners into this section from the interim reports. These can be edited, and agreed to immediately following the oral examination.)

Dr Amiya advised the to address the following issues:

Ontology has been implemented in OWL; why not try using Shapes Constraint Language (SHACL)?
Page 118: APIs can be vulnerable to a wide range of security risks, which can lead to data breaches, unauthorized access, and other forms of abuse, then how your model is addressing these vulnerability?
Page. 128: Countermeasures in cybersecurity addressed but and what about mitigation? This two goes hand in hand.
Page: 133: Which LLMs (Generative AI) models used?
Page: 140: How the Rule Engine or Inference System be evaluated, means the correctness?
Page 173: Accuracy å 0.833 is this sufficient? Even though a better F1 score å 0.889 is obtained.
Apart from SWRL other stuffs like Declarative Logic Programs (SWSL Rule) and First Order Classical Logic (SWSL-FOL), etc. are there then why SWRL?

Dr Bharanidharan advised the following amendments:

1. The clarity of some of the images in chapters 5 and 7 could be improved.(For ex Fig 6.2 is not visible)
2. The datasets used needs more clarity in the thesis – How the future researchers can download and reproduce the results.
3. Where possible, it would be appreciated if a holistic diagram could be introduced to explain the whole architecture/framework or by providing an expanded version of Figure 3.2.
4. How do you verify the results produce by GenAI is comparable and valid?
5. It would be appreciated if the areas related to privacy can be explained clearly as I can see some ambiguity in explanations related to Privacy.

Summary Recommendation

*The Examiners jointly recommend **(check one only)**:*

a) Passed without conditions ☐

b) Passed subject to minor amendments being made to the satisfaction of the Principal Supervisor (within 6 weeks) ☒

c) Passed subject to major amendments being made to the satisfaction of the relevant Associate Dean Research (within 3 months) ☐

d) Revised and resubmitted for examination to named Examiner (within 12 months) ☐

e) Failed ☐

OR Agreement between the Examiners could not be reached (please provide details below)

Declaration: By signing this report, I acknowledge that I have duly and accurately noted the outcomes stated by the Examiners who participated in this PhD Oral Examination.

Panel Chair Name: Dr Mohi Ahmed

Date: 30/09/2024

Panel Chair Signature: Mohiuddin Ahmed

Please return completed reports within two days* to: researchassessments@ecu.edu.au

* If this is not possible, contact the Dean (Graduate Research School) for an extension.